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TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No.
POU920000004US1

Re: Application Of: Novaes et al.

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
09/583,677	05/31/2000	Michael Young Won	46369	2155	2880

Invention: **METHOD, SYSTEM AND PROGRAM PRODUCTS FOR MANAGING A CLUSTERD COMPUTING ENVIRONMENT**

COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on November 23, 2004

The fee for filing this Appeal Brief is: **\$500.00**

- A check in the amount of the fee is enclosed.
- The Director has already been authorized to charge fees in this application to a Deposit Account.
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Blanche E. Schiller
Signature

Dated: **January 19, 2005**

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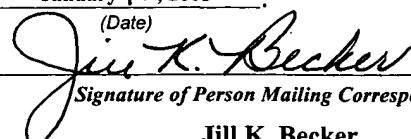
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U.S. PATENT AND TRADEMARK OFFICE
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES



Appellants: Novaes et al.

Group Art Unit: 2155

Serial No.: 09/583,677

Examiner: Michael Young Won

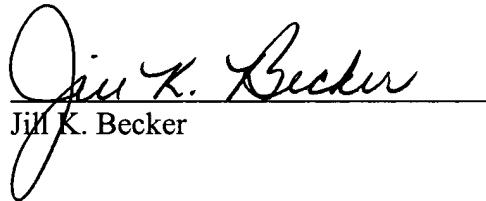
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Appeal No.:

Title: METHOD, SYSTEM AND PROGRAM PRODUCTS FOR MANAGING A CLUSTERED COMPUTING ENVIRONMENT

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Brief of Appellants

Dear Sir:

This is an appeal from a final rejection, mailed August 19, 2004, rejecting claims 1-3 and 6-76 of the above-identified application. The Appeal Brief is due within two months from the date the Notice of Appeal was received at the United States Patent and Trademark Office. Since appellants' postcard indicates that the Notice of Appeal was received on November 23, 2004, this Brief is initially due on or before January 23, 2005. Therefore, this Appeal Brief is timely filed. The Brief is accompanied by a transmittal letter authorizing the charging of appellants' deposit account for payment of the requisite fee set forth in 37 C.F.R. §1.11(c).

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Appellants' brief is being filed after the effective date of the final BPAI Rules, September 13, 2004, and, therefore, the format and content of appellants' brief is in compliance with the requirements set forth in 37 CFR §41.37(c). If appellants' brief does not comply with the requirements set forth in 37 CFR §41.37(c), appellants request notification of the reasons for noncompliance and the opportunity to file an amended brief pursuant to 37 CFR §41.37(d).

Real Party in Interest

This application is assigned to International Business Machines Corporation by virtue of an assignment executed by the co-inventors and recorded with the United States Patent and Trademark Office at reel 011186, frame 0683, on October 10, 2000. Therefore, the real party in interest is International Business Machines Corporation.

Related Appeals and Interferences

To the knowledge of the appellants, appellants' undersigned legal representative, and the assignee, there are no other appeals or interferences, which will directly affect or be directly affected by or have a bearing on the Board's decision in the instant appeal.

Status of Claims

This patent application was filed on May 31, 2000 with the U.S. Patent and Trademark Office. As filed, the application included 5 claims, of which 3 were independent claims (i.e., claims 1, 4 and 5).

On April 12, 2002, a Preliminary Amendment was filed, which amended claim 3, canceled claims 4 and 5, and added new claims 6-74, of which 2 were independent claims (i.e., claims 27 and 51).

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In an initial Office Action, dated January 28, 2004, claims 1-3 and 6-74 were rejected under 35 U.S.C. 102(e) as being anticipated by Wipfel et al. (U.S. Patent No. 6,338,112 B1). A Response to Office Action with a one-month extension of time was filed on May 28, 2004, in which claims 1, 27 and 51 were amended and new claims 75-76 were added.

On August 19, 2004, a final Office Action was issued, wherein claims 1-3 and 6-75 were rejected under 35 U.S.C. 102(e) as being anticipated by Wipfel et al. (U.S. Patent No. 6,338,112 B1); and claim 76 was rejected under 35 U.S.C. 103(a) as being unpatentable over Wipfel et al. in view of Thorbjornsen et al. (WO 96/37837). Appellants filed a Response to Final Office Action on October 19, 2004, in which no claims were amended.

Appellants received an Advisory Action, dated November 15, 2004, which indicated that the request for consideration had been considered, but did not place the application in condition for allowance. A Notice of Appeal to the Board of Patent Appeals and Interferences was filed on November 18, 2004 and received on November 23, 2004.

The status of the claims is as follows:

Claims allowed – None;

Claims objected to – None;

Claims rejected – 1-3 and 6-76; and

Claims canceled – 4 and 5.

Appellants are appealing the rejection of claims 1-3 and 6-76.

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Status of Amendments

Appellants' remarks proffered in the Response to the final Office Action, dated August 19, 2004 were considered. However, no claim amendment was effectuated by the Response. The claims as set out in Appendix A include all prior amendments.

Summary of Claimed Subject Matter

In one aspect of the invention, appellants claim a system (independent claim 1), a method (independent claim 27) and a program storage device (independent claim 51) for managing clusters of a computing environment. This system includes, for instance, a registry component to provide global data storage for global data of a cluster of the computing environment (see, e.g., FIG. 4, 402; page 15, lines 1-4 of appellants' specification), the cluster including a plurality of nodes of the computing environment (see, e.g., FIG. 4, 410; page 14, lines 1-2; FIG. 5, operating system instances 1-8) and the global data comprising configuration data of multiple nodes of the plurality of nodes (see, e.g., page 14, lines 25-26); a configuration component to maintain data locally on at least one node of the plurality of nodes, and to store global data in the registry component (see, e.g., FIG. 4, 400; page 14, lines 8-27); a liveness component to provide status of one or more communications paths of the cluster (see, e.g., FIG. 4, 404; page 15, lines 16-19), the liveness component being dependent upon the registry component and the configuration component (see, e.g., FIG. 6, 604; page 19, lines 4-21; FIG. 7, 704, 705; page 21, lines 9-14); a group services component to provide one or more services to one or more other components of the cluster (see, e.g., FIG. 4, 406; page 16, lines 4-10), the group services component being dependent on the registry component, the configuration component and the liveness component (see, e.g., FIG. 6, 604; page 19, lines 4-22; FIG. 7, 708, 706; page 21, lines 15-20); and a resource management component to provide communications to one or more resource controllers of the cluster (see, e.g., FIG. 4, 408; page 16, lines 15-21), the resource management component

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being dependent on the registry component, the configuration component and the group services component (see, e.g., FIG. 6, 604; page 19, lines 4-22; FIG. 7, 710, 712; page 21, lines 21-27).

As a further aspect, appellants recite in dependent claims 21, 45 and 69 that the defined order for starting one or more components by the configuration component comprises starting the registry component, then the liveness component, the group services component and the resource management component (see, e.g., FIG. 8, STEPS 1-4; page 27, lines 11-18).

As yet a further aspect, dependent claims 22, 46 and 70 recite that the registry component begins a first phase of its initialization, in response to being started, the first phase of initialization including determining at least one copy of a global configuration database to be used in the starting (see, e.g., FIG. 8, STEP 5; page 27, lines 19-27).

In a further example, dependent claims 23, 47 and 71 recite that the configuration component utilizes a copy of the at least one copy of the global configuration database to verify data and then continue with starting the liveness component, the group service component and the resource management component (see, e.g., FIG. 8, STEPs 6 and 7; page 28, lines 21-28; page 29, lines 1-7).

In another embodiment, dependent claims 24, 48 and 72 recite that the group services component completes its initialization, in response to the liveness component becoming available (see, e.g., FIG. 8, STEPS 11-13; page 29, lines 20-26; page 30, lines 1-2).

As yet a further example, dependent claims 25, 49 and 73 recite that the registry component begins a second phase of its initialization, in response to the group services component completing initialization, the second phase of its initialization including updating zero or more copies of the global configuration database to allow write operations against the global configuration database (see, e.g., FIG. 8, STEP 15; page 30, lines 6-16).

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In yet a further embodiment, dependent claim 76 recites that the computing environment is a shared nothing environment (see, e.g., page 12, lines 12-19).

Grounds of Rejection to Be Reviewed On Appeal

1. Claims 1-3 and 6-75 stand rejected under 35 U.S.C. 102(e) as being anticipated by Wipfel et al. (U.S. Patent No. 6,338,112 B1); and
2. Claim 76 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Wipfel et al. in view of Thorbjornsen et al. (WO 96/37837).

Argument

I. Rejection under 35 U.S.C. 102(e) over U.S. Patent No. 6,338,112 B1 to Wipfel et al.

A. Claims 1-3 and 6-75

Claims 1-3 and 6-75 stand rejected under 35 U.S.C. 102(e) as being anticipated by Wipfel et al., U.S. Patent No. 6,338,112. Appellants respectfully submit that the rejection of these claims is erroneous and respectfully request reversal of this rejection for at least the reasons below.

1. Independent claims 1, 27 and 51:

Appellants' invention is directed, in one aspect, to managing clusters of a computing environment. Various cluster components, having different dependencies upon one another, are provided in order to manage clusters of the computing environment.

As one particular example, appellants claim a system of managing clusters of a computing environment, in which the system includes, for instance, a registry component to

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provide global data storage for global data of a cluster of the computing environment, the cluster including a plurality of nodes of the computing environment and the global data including configuration data of multiple nodes of the plurality of nodes; a configuration component to maintain data locally on at least one node of the plurality of nodes, and to store global data in the registry component; a liveness component to provide status of one or more communications paths of the cluster, the liveness component being dependent upon the registry component and the configuration component; a group services component to provide one or more services to one or more other components of the cluster, the group services component being dependent on the registry component, the configuration component and the liveness component; and a resource management component to provide communications to one or more resource controllers of the cluster, the resource management component being dependent on the registry component, the configuration component and the group services component. Thus, various components are provided, each having a particular task and most of which have dependencies on other components.

Appellants respectfully submit that one or more of the specific dependencies of a component on one or more other components recited in appellants' independent claims are not described, taught or suggested in Wipfel. Appellants explicitly recite dependencies between different components of the system. If a component is dependent on another component, then that component is reliant or contingent upon the other component, as defined in Webster's Ninth New Collegiate Dictionary. Wipfel fails to mention the word dependent (or a derivative thereof), except in Col. 12, line 51, in which it states, "[W]hich steps should be tried depend on the likely cause of failure." There is no description in Wipfel of a component being dependent on another component. Even if one or more dependencies may be implied in Wipfel (which is not being conceded), one or more of the particular dependencies claimed by appellants is not described, taught or suggested in Wipfel.

For instance, appellants claim that the liveness component is dependent upon a registry component. No such dependency exists in Wipfel. It is indicated in the Office Action that

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Wipfel has a registry, which is 600, and that a liveness probe is described in Cols. 9-11. However, during the discussion of the liveness function, there is no mention of registry component 600. Since this component is not even mentioned during this discussion, it follows that the liveness component is not dependent upon the registry of Wipfel. Although further on in the specification of Wipfel, it indicates that memory probes may be performed on structure 600, this optional operation does not rise to the level of a dependency, as claimed by appellants. Thus, Wipfel fails to describe, teach or suggest one or more of the dependencies that are recited in appellants independent claims.

As a further example, it is indicated in the Office Action that a group services component is recited at Col. 9, lines 7-9 of Wipfel, and that the group services component is dependent on a registry component, since probing is dependent on a value stored in a register. Appellants respectfully submit that lines 7-9 of Col. 9 merely recite functions that can be performed and do not indicate any dependencies. Further, appellants respectfully submit that a register is not a registry component. Although the term register is used, a register is very different from the registry component being claimed by appellants. The register of Wipfel is, for instance, a memory location or structure that can be probed to determine whether the node local to the register is alive. Such a register is very different from the registry component claimed by appellants. In sharp contrast to appellants' claimed registry component, the register cited in Wipfel is local to a particular node and just includes information, such as liveness information, regarding that node. It does not include global configuration data of multiple cluster nodes, but only information from one node. In contrast to Wipfel's register, appellants' registry component includes global configuration data of multiple cluster nodes. Thus, the register of Wipfel does not describe, teach or suggest appellants' claimed registry component.

Since the register is not the same as appellants' registry component, and since there is no indication in the Office Action of a dependency on registry 600 for this particular component, appellants respectfully submit that the rejection based on this claimed element is erroneous.

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For at least the above reasons, appellants respectfully submit that one or more of the dependencies explicitly recited in appellants' independent claims are not described, taught or suggested in Wipfel, and therefore, Wipfel does not anticipate appellants' claimed invention.

2. Dependent claims 2-3, 6-26, 28-50 and 52-75:

Appellants respectfully submit that the dependent claims are patentable for the same reasons as the independent claims, as well as for their own additional features. Various cluster components, having differing dependencies upon one another, are provided in order to manage the clusters. The dependencies of these components are explicitly recited in the dependent claims. Appellants respectfully submit that these specific dependencies, examples of which are described below, are not described, taught or suggested in Wipfel.

a. Dependent claims 21, 45 and 69:

For example, dependent claims 21, 45 and 69 specifically recite that the configuration component is responsible for starting the registry component, the liveness component, the group services component and the resource management component in a defined order. Specifically, that defined order, as recited in the claims, includes starting the registry component, and then the liveness component, the group services component and the resource management component. Appellants respectfully submit that there is no such description, teaching or suggestion in Wipfel of a configuration component starting these other components in this particular order. Wipfel fails to address the starting of the components, and in particular, fails to define the particular order in which the components are started. Wipfel is silent as to this feature.

In the Office Action, support for this rejection is indicated at Col. 8, lines 40-52. However, a careful reading of that section merely indicates that resources are to be efficiently managed and that this management includes detecting failures, compensating failures and reallocating shareable resources between nodes. There is no discussion at all of a configuration component starting other components of the system in a particular order. For example, there is

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no discussion in the cited section or in other sections of Wipfel of the configuration component starting the registry component, and then the liveness component, the group services component and the resource management component. Such an ordering is missing from the teachings of Wipfel. For at least this reason, appellants respectfully submit that the rejection of claims 21, 45 and 69, and any claims that depend therefrom, is erroneous, and respectfully request an indication of allowability for those claims.

b. Dependent claims 22, 46 and 70:

As a further example, claims 22, 46 and 70 specifically recite that the registry component begins a first phase of its initialization, in response to being started, and that first phase of initialization includes determining at least one copy of a global configuration database to be used in the starting. Again, Wipfel fails to describe, teach or suggest one or more of these claimed features. For instance, there is no discussion at all in Wipfel of the phases of initialization. Further, there is no discussion that the first phase of initialization of the registry component includes determining a copy of a global configuration database to be used in the starting. Such features are not described, taught or suggested in Wipfel.

In the Office Action, support for this rejection is indicated at, for instance, Col. 9, lines 61-67. This section may mention the word initialization, but there is no description, teaching or suggestion of phases of initialization nor is there any description, teaching or suggestion of a registry component, in response to being started, beginning a first phase of initialization and that first phase of initialization including determining at least one copy of a global configuration database to be used in the starting. Instead, this section of Wipfel merely mentions that memory may be initialized at startup, and if so, validation 510 may be set to a value other than an initial value. There is no discussion in Wipfel of a first phase of initialization of a registry component that includes determining at least one copy of a global configuration database to be used in the starting. Since one or more of these features are missing from Wipfel, appellants respectfully submit that claims 22, 46 and 70 are not anticipated by Wipfel.

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Further support for this rejection is indicated at Col. 15, line 61 to Col. 16, line 5 and FIG. 7 of Wipfel. Again, appellants respectfully submit that this section fails to describe, teach or suggest one or more features claimed by appellants in claims 22, 46 and 70. Although the words global and initialization may be found in this section, this section does not describe, teach or suggest a registry component beginning a first phase of its initialization, in response to being started, and that first phase of initialization comprising determining at least one copy of a global configuration database to be used in the starting. Instead, this section of Wipfel merely teaches how to make room in a global queue and how to add to the global queue. There is no description in this section or any other section of Wipfel of one or more features of appellants' claimed invention. Therefore, appellants respectfully submit that the rejection of dependent claims 22, 46 and 70, and any claims that depend therefrom, is erroneous, and respectfully request an indication of allowability for those claims.

c. Dependent claims 23, 47 and 71:

As yet a further example, claims 23, 47 and 71 specifically indicate that the configuration component utilizes a copy of the at least one copy of the global configuration database to verify data, and then continues with starting the liveness component, the group services component and the resource management component. Again, these specific elements and dependencies are not described, taught or suggested in Wipfel. Wipfel makes no mention of a configuration component utilizing a copy of a global configuration database determined during the first phase of initialization of a registry component to verify data and then continue with starting a liveness component, a group services component and a resource management component. These details are missing from Wipfel.

In the Office Action, support for this rejection is indicated at Col. 8, lines 17-20 of Wipfel. However, appellants respectfully submit that a careful reading of this section merely states that other cluster configurations place all shared memory on a single node or in a separate device. There is no discussion in this section or other sections of Wipfel of utilizing a copy of

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the global configuration database determined during a first phase of initialization of a registry component to verify data and then continue with starting the liveness component, the group services component and the resource component. Since one or more of these elements are missing from Wipfel, appellants respectfully submit that the rejection of claims 23, 47 and 71, and any claims depending therefrom, is erroneous, and respectfully request an indication of allowability for those claims.

d. Dependent claims 24, 48 and 72:

In another example, claims 24, 48 and 72 specifically recite that the group services component completes its initialization, in response to the liveness component becoming available. There is no such dependency described in Wipfel. That is, there is no description, teaching or suggestion in Wipfel of such a relationship in which a group services component completes its initialization, in response to the liveness component becoming available. Again, such details are missing from Wipfel.

In the Office Action, support for this rejection is indicated at Col. 8, lines 57-64. This section merely indicates that when a node is restored to membership or a node is added to the cluster, that the resource is to be managed appropriately, including notifying the rest of the cluster. There is no discussion in this section or other sections of Wipfel of when initialization of a particular component is to be completed. There is no description, teaching or suggestion in Wipfel of completing initialization of a group services component, in response to the liveness component becoming available. Since Wipfel fails to describe, teach or suggest at least this dependency, appellants respectfully submit that the rejection of claims 24, 48 and 72, as well as for any claims that depend therefrom, is erroneous, and respectfully request an indication of allowability for those claims.

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e. Dependent claims 25, 49 and 73:

As yet a further example, appellants explicitly recite in dependent claims 25, 49 and 73 that a registry component begins a second phase of its initialization, in response to the group services component completing initialization, and that the second phase of initialization includes updating zero or more copies of the global configuration database to allow write operations against the global configuration database. Again, these specific elements and dependencies are not described, taught or suggested in Wipfel. Wipfel makes no mention of different phases of initialization. Further, Wipfel makes no mention of a registry component beginning a second phase of its initialization, in response to a group services component completing initialization. Yet further, Wipfel makes no mention of a second phase of initialization including updating zero or more copies of the global configuration database to allow write operations against the global configuration database. Thus, Wipfel fails to describe, teach or suggest one or more aspects of appellants' claimed invention.

In the Office Action, support for this rejection is indicated at Col. 9, lines 48-52 and Col. 28, line 58. These sections merely indicate that values may be updated. The updating of values is not a teaching or suggestion of the specific elements claimed by appellants. Again, there is no description in this section or in any other section of Wipfel of a registry component beginning a second phase of its initialization, in response to a group services component completing initialization, in which the second phase of initialization comprises updating zero or more copies of a global configuration database to allow write operations against the global configuration database. Thus, appellants respectfully submit that the rejection of claims 25, 49 and 73, and any claims that depend therefrom, is erroneous, and respectfully request an indication of allowability for those claims.

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II. Rejection under 35 U.S.C. 103(a) over U.S. Patent No. 6,338,112 B1 to Wipfel et al. in view of European Patent No. WO 96/37837 to Thorbjornsen et al.

Claim 76 is rejected as being unpatentable over Wipfel in view of Thorbjornsen. Appellants respectfully submit that the rejection of this claim is erroneous and respectfully request reversal of this rejection for at least the reasons below.

Claim 76 explicitly recites that the computing environment is a shared nothing environment. Thus, in this aspect of appellants' claimed invention, various components of a shared nothing computing environment are used to manage clusters of that environment. In contrast to this claimed feature, Wipfel specifically describes an environment in which shared resources are used to manage a cluster. In particular, Wipfel describes the use of shared memory, as well as shared nonvolatile storage (see, e.g., Fig. 2) in managing a clustered environment. This use is described throughout Wipfel. Thus, Wipfel does not describe a shared nothing environment, as explicitly admitted in the Final Office Action (see, e.g., page 8). Therefore, Thorbjornsen is relied upon. However, appellants respectfully submit that the combination of Wipfel and Thorbjornsen is improper, and thus, for at least this reason, respectfully request withdrawal of the rejection based on the combination.

For example, the combination is improper, since there is no teaching or suggestion in the references themselves to make the combination or modification suggested in the Office Action. It is well known that:

It is insufficient to establish obviousness that the separate elements of the invention existed in the prior art; absent some teaching or suggestion, in the prior art, to combine the elements. *Arkie Lures Inc. v. Gene Larew Tackle Inc.*, 43 USPQ2d 1294, 1297 (Fed. Cir. 1997).

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Appellants respectfully submit that there is no such teaching or suggestion in the references themselves. In fact, one would not combine Wipfel and Thorbjornsen, since Wipfel explicitly uses shared resources and is not concerned at all with a shared nothing environment.

Justification for the combination is stated in the Office Action, as follows:

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ the teachings of Thorbjornsen within the system of Wipfel by implementing a share nothing environment within the cluster managing system because Thorbjornsen teaches that within a share nothing architecture, the nodes are divided into groups because this provides multi-fault tolerance and fault masking (see page 6, lines 24-31).

Again, appellants respectfully submit that the above justification does not indicate where the references explicitly teach the combination. Instead, the above appears to be hindsight reconstruction of appellants' invention. That is, the justification is simply a selection of various elements of the combination in an attempt to create appellants' invention, rather than a reason for the combination drawn from the references or from the knowledge available to one of ordinary skill in the art. For this reason alone, the combination is improper.

Additionally, the combination is improper because Wipfel teaches away from the combination. In Wipfel, shared resources are used to manage the environment. The teachings of Thorbjornsen of a shared nothing environment undermine the teachings of Wipfel, in which shared resources are explicitly used and needed. Thus, Wipfel teaches away from the proposed combination.

Further, the modification of Wipfel to have a shared nothing environment would destroy the intended function of Wipfel that specifically teaches the use of shared resources. Thus, the combination of Wipfel and Thorbjornsen is improper.

Appellants respectfully submit that one of ordinary skill in the art would not combine the teachings of vastly different environments to solve a problem of one environment. That is, one

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skilled in the art would not combine the teachings of an environment that uses shared resources with a shared nothing environment. Thus, one skilled in the art would not combine the teachings of Wipfel and Thorbjornsen. For at least these reasons, appellants respectfully submit that claim 76 is patentable over the combination of Wipfel and Thorbjornsen.

Conclusion

For all of the above reasons, appellants allege error in rejecting their claims as anticipated by Wipfel and/or obvious over Wipfel and Thorbjornsen. Accordingly, reversal of all rejections is respectfully requested.

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Dated: January 18, 2005

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Appendix A

1. A system of managing clusters of a computing environment, said system comprising:

 a registry component to provide global data storage for global data of a cluster of said computing environment, said cluster including a plurality of nodes of said computing environment and said global data comprising configuration data of multiple nodes of the plurality of nodes;

 a configuration component to maintain data locally on at least one node of said plurality of nodes, and to store global data in said registry component;

 a liveness component to provide status of one or more communications paths of said cluster, said liveness component being dependent upon said registry component and said configuration component;

 a group services component to provide one or more services to one or more other components of said cluster, said group services component being dependent on said registry component, said configuration component and said liveness component; and

 a resource management component to provide communications to one or more resource controllers of said cluster, said resource management component being dependent on said registry component, said configuration component and said group services component.

2. The system of claim 1, wherein said registry component is dependent on said group services component for at least one type of operation.

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3. The system of claim 2, wherein said at least one type of operation comprises a write operation.

6. The system of claim 2, wherein said registry component is functionally dependent on said group services component.

7. The system of claim 1, wherein said being dependent comprises being functionally dependent.

8. The system of claim 7, wherein said registry component lacks a data dependency on said configuration component, said liveness component, said group services component and said resource management component.

9. The system of claim 7, wherein said configuration component has a data dependency on said registry component.

10. The system of claim 7, wherein said liveness component has a data dependency on said registry component.

11. The system of claim 7, wherein said group services component has a data dependency on said registry component.

12. The system of claim 7, wherein said resource management component has a data dependency on said registry component.

13. The system of claim 7, wherein said liveness component has a data dependency on said configuration component.

14. The system of claim 7, wherein said group services component has a data dependency on said configuration component.

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15. The system of claim 7, wherein said resource management component has a data dependency on said configuration component.

16. The system of claim 1, wherein said cluster includes a plurality of nodes, and wherein said registry component is included on less than all nodes of said plurality of nodes.

17. The system of claim 1, wherein said configuration component is started by at least one operating system of at least one node of said one or more nodes of said computing environment.

18. The system of claim 1, wherein said configuration component is responsible for starting one or more components of said registry component, said liveness component, said group services component and said resource management component.

19. The system of claim 18, wherein the starting of one or more components satisfies at least one of one or more functional dependencies between the one or more components and one or more data dependencies between the one or more components.

20. The system of claim 18, wherein said one or more components are started by the configuration component in a defined order.

21. The system of claim 20, wherein said defined order comprises starting the registry component, and then the liveness component, the group services component and the resource management component.

22. The system of claim 21, wherein said registry component begins a first phase of its initialization, in response to being started, said first phase of initialization comprising determining at least one copy of a global configuration database to be used in the starting.

23. The system of claim 22, wherein said configuration component utilizes a copy of said at least one copy of the global configuration database to verify data, and then continue with

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starting the liveness component, the group services component and the resource management component.

24. The system of claim 23, wherein said group services component completes its initialization, in response to the liveness component becoming available.

25. The system of claim 24, wherein said registry component begins a second phase of its initialization, in response to the group services component completing initialization, said second phase of initialization comprising updating zero or more copies of the global configuration database to allow write operations against the global configuration database.

26. The system of claim 25, wherein said resource management component performs its initialization using said system registry component and said group services component.

27. A method of managing clusters of a computing environment, said method comprising:

providing, via a registry component, global data storage for global data of a cluster of said computing environment, said cluster including a plurality of nodes of said computing environment and said global data comprising configuration data of multiple nodes of the plurality of nodes;

maintaining, via a configuration component, data locally on at least one node of said plurality of nodes, and to store global data in said registry component;

providing, via a liveness component, status of one or more communications paths of said cluster, said liveness component being dependent upon said registry component and said configuration component;

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providing, via a group services component, one or more services to one or more other components of said cluster, said group services component being dependent on said registry component, said configuration component and said liveness component; and

providing, via a resource management component, communications to one or more resource controllers of said cluster, said resource management component being dependent on said registry component, said configuration component and said group services component.

28. The method of claim 27, wherein said registry component is dependent on said group services component for at least one type of operation.

29. The method of claim 28, wherein said at least one type of operation comprises a write operation.

30. The method of claim 28, wherein said registry component is functionally dependent on said group services component.

31. The method of claim 27, wherein said being dependent comprises being functionally dependent.

32. The method of claim 31, wherein said registry component lacks a data dependency on said configuration component, said liveness component, said group services component and said resource management component.

33. The method of claim 31, wherein said configuration component has a data dependency on said registry component.

34. The method of claim 31, wherein said liveness component has a data dependency on said registry component.

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35. The method of claim 31, wherein said group services component has a data dependency on said registry component.

36. The method of claim 31, wherein said resource management component has a data dependency on said registry component.

37. The method of claim 31, wherein said liveness component has a data dependency on said configuration component.

38. The method of claim 31, wherein said group services component has a data dependency on said configuration component.

39. The method of claim 31, wherein said resource management component has a data dependency on said configuration component.

40. The method of claim 27, wherein said cluster includes a plurality of nodes, and wherein said registry component is included on less than all nodes of said plurality of nodes.

41. The method of claim 27, wherein said configuration component is started by at least one operating system of at least one node of said one or more nodes of said computing environment.

42. The method of claim 27, further comprising starting, via said configuration component, one or more components of said registry component, said liveness component, said group services component and said resource management component.

43. The method of claim 42, wherein the starting of one or more components satisfies at least one of one or more functional dependencies between the one or more components and one or more data dependencies between the one or more components.

44. The method of claim 42, wherein said one or more components are started by the configuration component in a defined order.

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45. The method of claim 44, wherein said defined order comprises starting the registry component, and then the liveness component, the group services component and the resource management component.

46. The method of claim 45, further comprising beginning, by said registry component, a first phase of its initialization, in response to being started, said first phase of initialization comprising determining at least one copy of a global configuration database to be used in the starting.

47. The method of claim 46, further comprising utilizing, by said configuration component, a copy of said at least one copy of the global configuration database to verify data, and then continue with starting the liveness component, the group services component and the resource management component.

48. The method of claim 47, further comprising completing, by said group services component, its initialization, in response to the liveness component becoming available.

49. The method of claim 48, further comprising beginning, by said registry component, a second phase of its initialization, in response to the group services component completing initialization, said second phase of initialization comprising updating zero or more copies of the global configuration database to allow write operations against the global configuration database.

50. The method of claim 49, further comprising performing, by said resource management component, its initialization using said system registry component and said group services component.

51. At least one program storage device readable by a machine tangibly embodying at least one program of instructions executable by the machine to perform a method of managing clusters of a computing environment, said method comprising:

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providing, via a registry component, global data storage for global data of a cluster of said computing environment, said cluster including a plurality of nodes of said computing environment and said global data comprising configuration data of multiple nodes of the plurality of nodes;

maintaining, via a configuration component, data locally on at least one node of said plurality of nodes, and to store global data in said registry component;

providing, via a liveness component, status of one or more communications paths of said cluster, said liveness component being dependent upon said registry component and said configuration component;

providing, via a group services component, one or more services to one or more other components of said cluster, said group services component being dependent on said registry component, said configuration component and said liveness component; and

providing, via a resource management component, communications to one or more resource controllers of said cluster, said resource management component being dependent on said registry component, said configuration component and said group services component.

52. The at least one program storage device of claim 51, wherein said registry component is dependent on said group services component for at least one type of operation.

53. The at least one program storage device of claim 52, wherein said at least one type of operation comprises a write operation.

54. The at least one program storage device of claim 52, wherein said registry component is functionally dependent on said group services component.

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55. The at least one program storage device of claim 51, wherein said being dependent comprises being functionally dependent.

56. The at least one program storage device of claim 55, wherein said registry component lacks a data dependency on said configuration component, said liveness component, said group services component and said resource management component.

57. The at least one program storage device of claim 55, wherein said configuration component has a data dependency on said registry component.

58. The at least one program storage device of claim 55, wherein said liveness component has a data dependency on said registry component.

59. The at least one program storage device of claim 55, wherein said group services component has a data dependency on said registry component.

60. The at least one program storage device of claim 55, wherein said resource management component has a data dependency on said registry component.

61. The at least one program storage device of claim 55, wherein said liveness component has a data dependency on said configuration component.

62. The at least one program storage device of claim 55, wherein said group services component has a data dependency on said configuration component.

63. The at least one program storage device of claim 55, wherein said resource management component has a data dependency on said configuration component.

64. The at least one program storage device of claim 51, wherein said cluster includes a plurality of nodes, and wherein said registry component is included on less than all nodes of said plurality of nodes.

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65. The at least one program storage device of claim 51, wherein said configuration component is started by at least one operating system of at least one node of said one or more nodes of said computing environment.

66. The at least one program storage device of claim 51, wherein said method further comprises starting, via said configuration component, one or more components of said registry component, said liveness component, said group services component and said resource management component.

67. The at least one program storage device of claim 66, wherein the starting of one or more components satisfies at least one of one or more functional dependencies between the one or more components and one or more data dependencies between the one or more components.

68. The at least one program storage device of claim 66, wherein said one or more components are started by the configuration component in a defined order.

69. The at least one program storage device of claim 68, wherein said defined order comprises starting the registry component, and then the liveness component, the group services component and the resource management component.

70. The at least one program storage device of claim 69, wherein said method further comprises beginning, by said registry component, a first phase of its initialization, in response to being started, said first phase of initialization comprising determining at least one copy of a global configuration database to be used in the starting.

71. The at least one program storage device of claim 70, wherein said method further comprises utilizing, by said configuration component, a copy of said at least one copy of the global configuration database to verify data, and then continue with starting the liveness component, the group services component and the resource management component.

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72. The at least one program storage device of claim 71, wherein said method further comprises completing, by said group services component, its initialization, in response to the liveness component becoming available.

73. The at least one program storage device of claim 72, wherein said method further comprises beginning, by said registry component, a second phase of its initialization, in response to the group services component completing initialization, said second phase of initialization comprising updating zero or more copies of the global configuration database to allow write operations against the global configuration database.

74. The at least one program storage device of claim 73, wherein said method further comprises performing, by said resource management component, its initialization using said system registry component and said group services component.

75. The system of claim 1, wherein the configuration data comprises multiple node definitions for the multiple nodes.

76. The system of claim 1, wherein said computing environment is a shared nothing environment.